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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,233	10/31/2003	Chihaya Adachi	10020/18103	2304
26646	7590	11/01/2007		
KENYON & KENYON LLP ONE BROADWAY NEW YORK, NY 10004			EXAMINER YAMNITZKY, MARIE ROSE	
			ART UNIT 1794	PAPER NUMBER
			MAIL DATE 11/01/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/698,233	<b>Applicant(s)</b> ADACHI ET AL.	
	<b>Examiner</b> Marie R. Yamnitzky	<b>Art Unit</b> 1794	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 August 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 39,41-50 and 52-60 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 39,41-50 and 52-60 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

1. This Office action is in response to applicant's amendment received August 09, 2007, which amends the specification.

Claims 39, 41-50 and 52-60 are pending.

2. The objection to the disclosure for informalities as set forth in the Office action mailed May 04, 2007 is overcome by applicant's amendment to the specification.

3. Based on applicant's remarks accompanying the amendment received August 09, 2007, the examiner previously incorrectly equated the phrases "energy less than" and "energy level lower than" as used in the present application.

Based on applicant's remarks, a comparison of "energy" requires a comparison of absolute values whereas a comparison of "energy level" requires a comparison of the actual values. For example, if the LUMO of substance A is  $-2.87\text{eV}$  and the LUMO of substance B is  $-3.12\text{eV}$ , the LUMO energy of substance A is less than the LUMO energy of substance B ( $2.87 < 3.12$ ), but the LUMO energy level of substance B is lower than the LUMO energy level of substance A. If this is not correct, clarification is required.

4. The rejection of claims 39, 41-50 and 52-60 under 35 U.S.C. 112, 1<sup>st</sup> paragraph, as failing to disclose the best mode contemplated by the inventor, is withdrawn. The present specification discloses "representative" embodiments for the phosphorescent dopant material and for the electron transporting host material, and provides examples of devices in which  $\text{Ir(ppy)}_3$  is doped

into TAZ, OXD7 or BCP. Using the HOMO and LUMO values set forth in Tables 4 and 5 of Exhibit 1051 (filed February 12, 2007), comparing absolute values to determine the relationship between HOMO energy and ionization potential of dopant and host, respectively, and comparing actual values to determine the relationship between LUMO energy of the dopant and LUMO energy of the host, the devices disclosed in the present specification having Ir(ppy)<sub>3</sub> doped into TAZ or BCP do not meet the LUMO energy level relationship required by the present claims. Further, it is doubtful that the disclosed device having Ir(ppy)<sub>3</sub> doped in OXD7 meets the LUMO energy level relationship required by the present claims (e.g. in paragraph [0035] of US 2006/0231843 A1, Qin et al. teach that OXD7 has the same HOMO and LUMO values as BCP).

However, although there is now evidence of record suggesting that none of the exemplary devices disclosed in the application as originally filed meets the present claim limitations, it is not clear from the record that, at the time of filing the application, applicant deliberately failed to disclose the best mode with respect to the presently claimed invention.

The examiner notes that while the combination of Alq<sub>3</sub> as electron transporting host with PtOEP as phosphorescent dopant material was known in the art at the time of the present invention, there was no suggestion in the application as originally filed that this combination would meet the energy/energy level limitations recited in present claims 39 and 50. It is not clear from the record whether, at the time of filing the application, applicant recognized that this combination would meet the energy/energy level limitations recited in claims 39 and 50.

5. Claims 39, 41-50 and 52-60 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The application as originally filed provides insufficient guidance to make the invention commensurate in scope with the present claims without undue experimentation.

The present claims require an electron transporting host material and a phosphorescent dopant material having a specified relationship between HOMO energy of the dopant and ionization potential of the host, and having a specified relationship between LUMO energy level of the dopant and LUMO energy level of the host.

The specification teaches various exemplary materials for the dopant and host, and some of the present dependent claims limit the host or dopant to a disclosed exemplary material. However, based on data presented in Exhibit 1051 (the Declaration of Daniel Nocera, Ph.D., filed February 12, 2007), at least some of the exemplary combinations of dopant and host materials do not meet the present claim limitations. For example, Ir(ppy)<sub>3</sub> as dopant (the dopant required by present claims 49 and 60) with TAZ as host (the host required by present claims 44 and 55) or with BCP as host (the host required by present claims 46 and 57) do not meet the dopant/host limitations required by the present independent claims. Further, it is doubtful that the disclosed device having Ir(ppy)<sub>3</sub> doped in OXD7 (the host required by present claims 42 and 53) meets the LUMO energy level relationship required by the present claims (e.g. in paragraph

[0035] of US 2006/0231843 A1, Qin et al. teach that OXD7 has the same HOMO and LUMO values as BCP).

Given the data of record, it is not clear whether there are any combinations of dopant and host materials selected from the exemplified materials that actually meet all dopant/host limitations of the present independent claims. Given the large number of phosphorescent materials and electron transporting materials, and the showing that at least some of the exemplary combinations disclosed in the specification do not meet the claim limitations even though teachings in the specification suggest that they do, it is the examiner's position that it would require undue experimentation on the part of one skilled in the art to make the claimed invention.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 39 and 50 are rejected under 35 U.S.C. 102(b) as being anticipated by Baldo et al. in *Nature*, Vol. 395, pp. 151-154 (September 10, 1998) as evidenced by applicant's arguments filed August 09, 2007.

Baldo et al. disclose an organic light emitting device comprising an anode, a cathode and an emissive layer wherein the emissive layer comprises an electron transporting host material

(Alq<sub>3</sub>) and a phosphorescent dopant material (PtOEP). The device also comprises a layer of Alq<sub>3</sub> between the emissive layer and the cathode, this layer of Alq<sub>3</sub> meeting the limitations of a second electron transporting layer as required by present claim 50.

The combination of Alq<sub>3</sub> and PtOEP meets the relationship between the HOMO energy of the dopant and the ionization potential of the electron transporting host material as required by the present claims, and meets the relationship between the LUMO energy levels of the phosphorescent dopant material and the electron transporting host material as required by the present claims, as admitted in the Remarks accompanying applicant's amendment filed August 09, 2007 (see the paragraph beginning at the bottom of page 6).

The combination of Alq<sub>3</sub> and PtOEP also meets the relationship between the triplet state energy of the phosphorescent dopant material and the electron transporting host material as required by the present claims.

8. Applicant's arguments filed August 09, 2007 with respect to the 112, 1<sup>st</sup> paragraph, lack of enablement rejection have been fully considered but they are not persuasive.

There are numerous electron transporting materials that could potentially function as a host material, and there are numerous phosphorescent materials that could potentially function as a dopant material.

The application as originally filed disclosed "representative" embodiments for the dopant and host materials, and provided examples of devices utilizing the dopant required by present claims 49 and 60 doped in a host as required in present claim 42, 44, 46, 53, 55 or 57. One of

Art Unit: 1794

ordinary skill in the art at the time of the invention might expect that at least the exemplary devices would utilize a combination of dopant and host materials meeting the energy/energy level limitations of the present claims. However, evidence now of record suggests that none of the exemplary devices meets the present claim limitations, and there is no clear guidance in the specification as to combinations of host and dopant materials selected from the disclosed representative materials that would meet the energy/energy level limitations of the present claims.

9. The reference made of record and not relied upon is considered pertinent to applicant's disclosure.

Table 1 on page 23 of Lamansky et al. (US 2002/01822441 A1) lists triplet energy values for PtOEP and Alq<sub>3</sub>, showing that the triplet state energy of PtOEP is less than the triplet state energy of Alq<sub>3</sub>.

10. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY  
October 28, 2007



MARIE YAMNITZKY  
PRIMARY EXAMINER

1794